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IS : 4492 - 1968
(Reaffirmed 1998)

Indian Standard
**SPECIFICATION FOR
WELDED V-BLOCKS
(DIAMETER RANGE 300 TO 2000 mm)**

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
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Indian Standard

SPECIFICATION FOR WELDED V-BLOCKS (DIAMETER RANGE 300 TO 2 000 mm)

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Indian Standard

SPECIFICATION FOR WELDED V-BLOCKS (DIAMETER RANGE 300 TO 2 000 mm)

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 22 January 1968, after the draft finalized by the Engineering Metrology Sectional Committee had been approved by the Mechanical Engineering Division Council.

0.2 Larger V-blocks are widely used in workshops engaged in manufacturing heavy components, such as rollers for rolling mills, columns of hydraulic press, integral reduction gears, rotors, big bearings and cylinders of hydraulic press. V-blocks are widely used for marking centres accurately, checking roundness of cylindrical workpiece, and checking of concentricity, non-parallelism, etc, and also for holding the workpiece while machining.

0.3 Welded V-blocks are usually supplied in matched pairs, which consist of two V-blocks of the same accuracy. Such a pair of V-blocks is used together for marking, machining and inspection of bigger workpieces. Clamps are provided to bridge the vee to secure the workpieces.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS:2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard specifies the sizes and other requirements of welded type V-blocks of large sizes used in the heavy engineering field.

*Rules for rounding off numerical values (*revised*).

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 Matched Pairs—Two V-blocks of similar size and of the same accuracy.

2.2 Working Surfaces—Flanks of vees and bases of V-blocks.

2.3 Tolerance on Flatness—The permitted variation in the degree of flatness.

NOTE — A surface is said to be flat when all the elements that make up that surface are in exactly the same plane. The degree of flatness is the proportion to which the various elements that go to make up the surface, lie exactly in the same plane.

2.4 Tolerance on Parallelism—The maximum permissible distance separating two imaginary parallel planes within which the surface under consideration can just be enclosed. The two imaginary parallel planes are parallel to the datum surface of the part in question.

2.5 Tolerance on Squareness—The maximum permissible distance separating two imaginary parallel planes, within which the surface under consideration can just be enclosed. The two imaginary parallel planes are perpendicular to the datum surface of the part in question.

2.6 The Minimum and Maximum Size of Workpiece—The minimum and maximum diameters of cylindrical workpiece that can be accommodated on the V-block.

3. MATERIAL

3.1 V-blocks shall be of welded construction and made from suitable quality of weldable steels.

4. DIMENSIONS AND ACCURACIES

4.1 The general dimensions for V-blocks shall be as given in Table 1, read with Fig. 1 and 2.

4.2 Accuracies of V-Blocks

4.2.1 V-blocks shall comply with the tolerances for flatness of working surfaces, parallelism of vee to base and squareness of bisecting plane of vee faces with respect to the base, as specified in Table 2.

TABLE 1 DIMENSIONS FOR V-BLOCKS

(Clause 4.1, and Fig. 1 & 2)

(All dimensions in millimetres)

SIZE		700	1 000	1 400	2 000
ANGLE OF VEE		90°	90°	110°	110°
SIZE OF WORKPIECE	<i>D Max</i>	700	1 000	1 400	2 000
	<i>D Min</i>	300	600	900	1 300
<i>a Nom</i>		150	200	225	300
<i>b Nom</i>		800	1 100	1 200	1 500
<i>b₁ Nom</i>		700	1 000	1 025	1 300
<i>b₂ Nom</i>		370	525	—	—
<i>c Nom</i>		270	320	350	430
<i>d Nom</i>		M30	M36	—	—
<i>d₂ Nom</i>		25	32	—	—
<i>e Nom</i>		60	60	60	60
<i>f Nom</i>		45	58	60	87
<i>g Nom</i>		30	30	38	38
<i>h Nom</i>		400	500	550	650
<i>h₁ Nom</i>		60	75	—	—
<i>j Nom</i>		25	25	25	25
<i>k Nom</i>		280	320	370	450
<i>m Nom</i>		25	28	28	32
<i>n Nom</i>		55	80	—	—

4.2.2 For matched pairs too, the tolerances specified in Table 2 shall apply.

TABLE 2 ACCURACIES OF V-BLOCKS

(Clauses 4.2.1, 4.2.2 and 4.2.4)

Values in $\mu\text{m} = 0.001 \text{ mm}$

SIZE OF V-BLOCK	PARALLELISM OF VEE TO BASE	SQUARENESS OF BISECTING PLANE OF VEE WITH BASE (Minutes of Arc)	MATCHING TOLERANCE
mm			
700	38	10	18
1 000	45	10	20
1 400	50	10	22
2 000	60	10	25

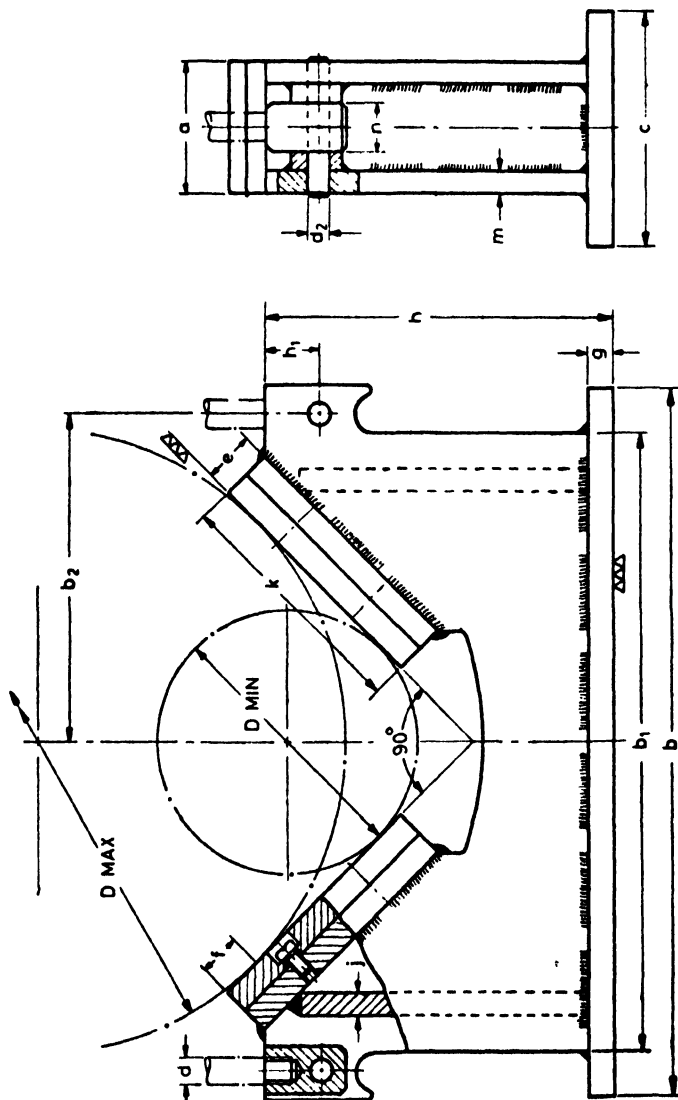


Fig. 1 DIMENSIONS FOR V-BLOCKS, SIZES 700 AND 1 000 mm

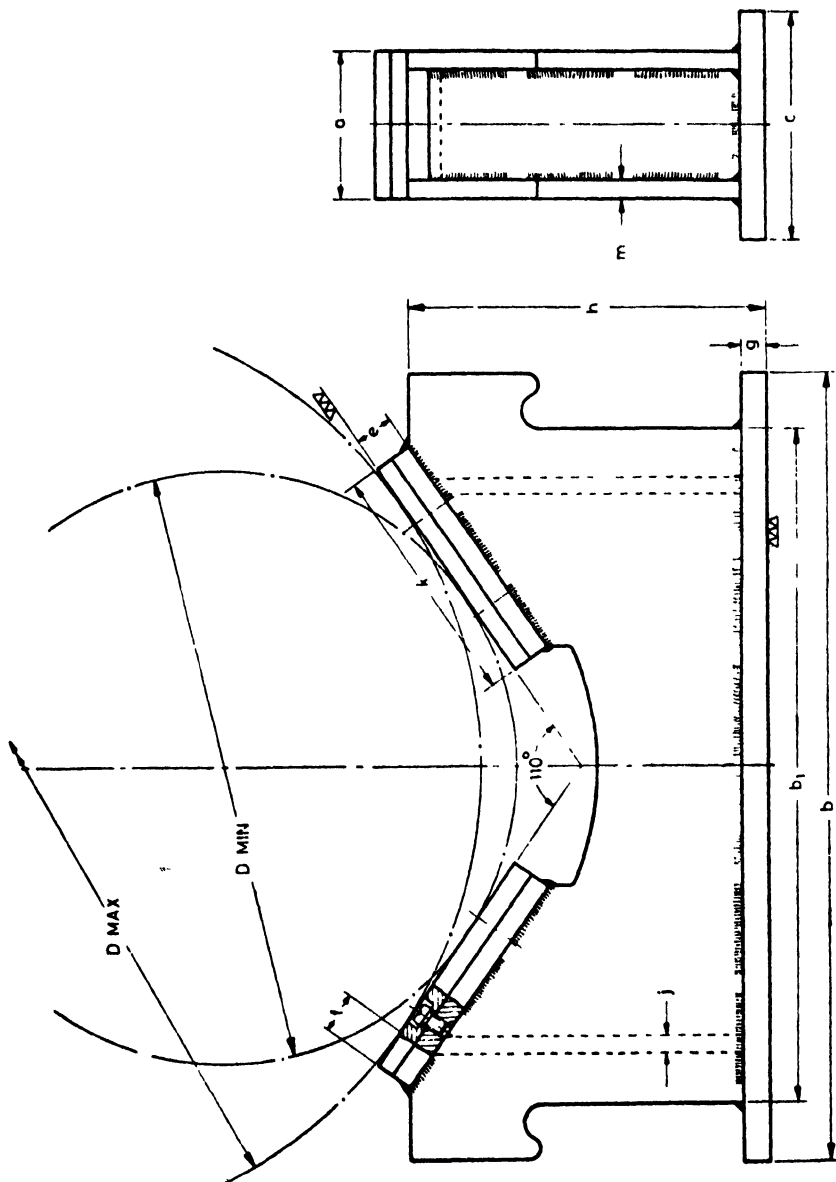


FIG. 2 DIMENSIONS FOR V-BLOCKS, SIZES 1 400 AND 2 000 mm

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4.2.3 Any departure from flatness in the case of vee flanks shall be a convexity and not a concavity, and on base surface it shall be a concavity.

4.2.3.1 In a direction parallel to the axis of the vee, the departure from flatness shall be a concavity and not a convexity.

4.2.4 The included angle of the vee shall be 90° for sizes 700 and 1 000 mm, and 110° for sizes 1 400 and 2 000 mm, with a tolerance of ± 5 minutes, and shall be positional subject to the conditions laid down in Table 2 where applicable.

5. DESIGNATION

5.1 V-blocks shall be designated by the nominal size and the number of this standard.

Example :

A V-block of size 700 mm shall be designated as :

V-Block 700 IS : 4492

6. GENERAL REQUIREMENTS

6.1 The welded structure of V-block shall be suitably annealed before machining operations, to releave it of the internal stresses developed due to welding*.

6.2 The flanks of vee shall be hardened to 54 to 58 HRC (*see* IS : 1586-1960†). They shall be rigidly secured, on the corresponding machined surfaces of the welded vee structure, with a suitable number of screws.

6.3 V-blocks of sizes 700 and 1 000 mm may be provided with clamping units, if required by the purchaser.

6.4 All sharp edges shall be removed. The V-blocks shall be free from non-metallic inclusions, porosity and other defects.

6.5 Bearing Area—V-blocks which are finished by hand scraping shall have a bearing area of not less than 20 percent. (A recommended method of determining this percentage is given in Appendix A.)

7. MARKING

7.1 The V-blocks shall have legibly marked upon it, its nominal size and the manufacturer's identification or trade-mark. Matched pairs shall be specifically marked for identification.

**See* ISI Handbook of manual metal-arc welding for welders.

†Method for Rockwell hardness test (B and C scales) for steel.

7.1.1 The product may also be marked with Standard mark.

7.1.1.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

8. PAINTING AND GREASING

8.1 All non-machined surfaces shall be painted. In case of matched pair, both the blocks shall be painted with the same colour of paint.

8.2 All working surfaces shall be suitably protected against corrosion by the application of suitable corrosion preventive.

9. PACKING

9.1 During storage and transit, all finished surfaces shall be suitably packed and protected against climatic conditions by being covered with a suitable corrosion preventive preparation.

A P P E N D I X A

(*Clause 6.5*)

DETERMINATION OF THE PROPORTION OF BEARING AREA

A-1. METHOD

A-1.1 A V-block master (*see A-2*), with its surface blued, is rubbed against the surfaces of the V-block to be tested. This will bring small bearing areas clearly into view. A small glass plate on which an area 40×40 mm has been ruled into 400 small squares 2×2 mm in size, is then placed upon the surface. Each small square is then observed in turn and a note made of the estimated fraction of its area (in tenths) which is occupied by a 'high spot' on the surface underneath.

A-1.2 The addition of all these fractions when divided by four gives the percentage of the bearing area of the surface over the region tested. The test is to be repeated at other positions on the surface in order to obtain a fair average figure.

A-1.3 It may be mentioned that after testing a few surfaces by this method, the results obtained, coupled with the general appearance of the bearing areas, enable a fairly close estimate to be made of the proportion of bearing area of a surface merely from its general appearance.

A-2. PREPARATION OF THE V-BLOCK MASTER

A-2.1 The V-block master, which has been rough machined, is rubbed against the blue surfaces of the master angle plate and the master surface plate (*see* Fig. 3 A and 3 B). This brings out into view the small bearing areas which shall be scraped off (*see* Fig. 4). This procedure is repeated until the master is produced which has the requisite number of spots per unit area uniformly distributed throughout the working surfaces.



FIG. 3 A

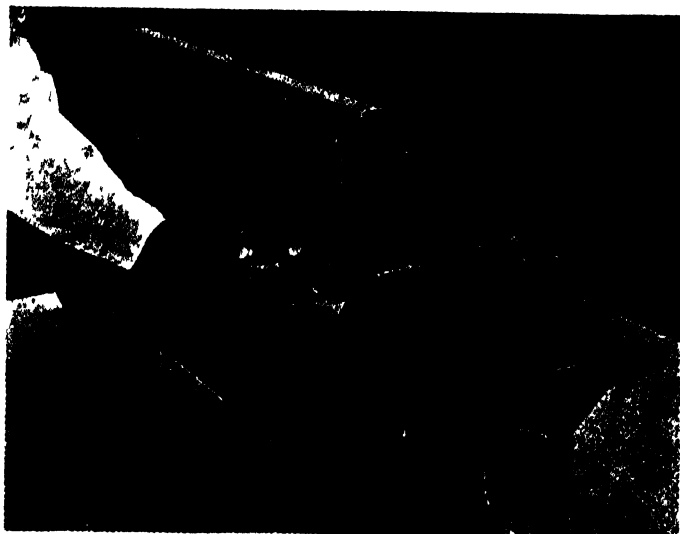


FIG. 3 B



FIG 4

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AMENDMENT NO. 1 AUGUST 1978
TO
IS:4492-1968 SPECIFICATION FOR WELDED
V-BLOCKS (DIAMETER RANGE 300 TO 2 000 mm)

Alterations

(*Page 8, clause 6.2, first sentence*) -
Substitute the following for the existing sentence:

'The flanks of vee shall be hardened to 54 to 58 HRC (see IS:1586-1968[†]).'

(*Page 8, foot-note with '†' mark*) -
Substitute the following for the existing foot-note:

'[†]Method for rockwell hardness test (B and C scales) for steel (*first revision*).'

(EDC 43)